

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problems Mailbox.**

Amendment to the SPECIFICATION:

Please replace the paragraph at Page 4, lines 3 to 19 of the specification with the following amended paragraph:

Until recent years, normal leakage through gaps in construction assemblies has been sufficient to maintain indoor air quality at healthy levels in dwellings. Modern building standards and construction practices intended to conserve energy have resulted in much tighter buildings with less leakage. Several states have adopted regulations that require mechanical ventilation to exhaust indoor contaminants including carbon dioxide, carbon monoxide, excessive moisture, indoor allergens, and volatile organic compounds given off by carpeting and other building materials. Devices available to meet mechanical ventilation requirements include continuously operated bathroom fans, heat recovery ventilators, and systems that duct outside air into heating/cooling system return air ducts. In the latter category, Lipidex produces an AirCycler_{TM} air handler system, U.S. Patents 5,547,017 and 5,881,806, that includes an outside air duct connected between the return air plenum of a forced air heating unit and an outside air intake. A controller operates a motorized damper in the outside air duct and cycles the heating unit blower to provide fresh air. To its credit, the Lipidex system distributes fresh air to all conditioned spaces, but because this system mixes a large volume of re-circulated air with outside air, it must move more air and uses more fan energy than a system that ventilates with 100% outside air. Neither this system, nor bathroom fans, nor heat recovery ventilators move sufficient air to provide effective ventilation cooling.

Please replace the paragraph at Page 6, lines 11 to 12 of the specification with the following amended paragraph:

FIG. 2 is a diagram of a user interface, a ~~the~~ wall display, unit showing cooling temperature settings according to an embodiment of the present invention.

Please replace the paragraph at Page 9, lines 16 to 22 of the specification with the following amended paragraph:

The user interface, wall display unit ("WDU") 1, includes a liquid crystal display ("LCD") screen, six buttons, ~~and~~ four indicator lights, and an indoor temperature sensor 28. Functions and labeling of said buttons 26, 27, 29, 30, and 37 change when different screens are selected. Program code that controls all ~~determines~~ WDU functions is contained in a microprocessor chip in control module 3 ~~the~~ WDU. The WDU 1 is connected to control module 3 by control wires 2. An outdoor temperature sensor 5 also connects to the control module by control wires 4. Outputs from the control module include blower motor control wires 7, pump control wires 8, damper control wires 14, and condensing unit control wires 6. Blower motor control wires 7 convey a "pulse width modulation" ("PWM") signal to the blower motor to regulate airflow rate.

Please replace the paragraph at Page 9, line 23 to Page 10, line 3 of the specification with the following amended paragraph:

The air handling unit ("AHU") 9 serves building interior 31 and includes blower unit 15 preferably powered by a variable speed motor 33. The AHU 9 may also include a heat exchange coil 10, which ~~includes~~ may include separate fluid passages for hot water and refrigerant, the latter being used for cooling purposes, and circulating pump 16. The

heat exchange coil optionally contains only hot water passages and is either upstream or downstream relative to the blower. In one embodiment, the refrigerant passages are used for cooling purposes and form upstream row 10b, while the downstream rows 10a are used for space heating using a circulating hot water loop. Separate coils for heating and air conditioning may also be used. An electronically commutated motor (ECM) 15 powers the blower wheel. The intake of the AHU 9 is connected to outside air damper 12 by a duct 11. Outdoor air stream 34 may pass through optional one- or two-stage evaporative cooler 35 before entering damper 12 through duct 36 at entry 12a. When indoor air is being re-circulated, through return duct 32, damper 12e rests against seals 12f creating an open passageway between return air inlet 12c (from return duct 32) and duct 11. ~~Damper 12e rotates counter-clockwise until it rests on seal 12g w~~ When outdoor air is needed for fresh air ventilation or ventilation cooling, damper 12e rotates counter-clockwise to second position 12h (referred to as the "open" position).

Please replace the paragraph at Page 10, lines 4 to 7 of the specification with the following amended paragraph:

~~The hot water passages of heat exchange coil~~ Coil rows 10 are connected to a heat source 18 by piping 20. Pump 16 circulates water between the heat source and the coil. Piping 19 carries refrigerant between the condensing unit and the coil rows 10b.

Please insert the following new paragraphs at Page 124, line 1 of the specification:

With reference to Fig. 1 and with the user interface 1 set to provide cooling, when the outdoor temperature sensed by outdoor temperature sensor 5 falls below the indoor

temperature sensed by the user interface's built-in temperature sensor **28**, by more than a temperature differential set using the user interface, blower motor **33** starts and damper motor **13** is activated, moving damper blade **12e** to position **12h** and resting on seals **12g**. As a result, AHU **9** causes outside air to enter the damper at intake **12a**, pass through filter **12d**, and flow to the building via supply air outlet **9a** that is connected to ducts that convey cool air to all rooms of the building interior **31**. Excess air pressure from the building interior **31** is relieved through return air intake **12c** to damper relief opening **12b**. If the indoor temperature falls below a low temperature limit calculated by control module **3**, or if the outdoor temperature exceeds the difference between the indoor temperature and the set temperature differential, the blower motor stops and the damper returns to its original position, resting on seals **12f**. It is understood that the blower speed varies with the cooling needed.

When the present invention is applied with vapor-compression cooling, if the indoor temperature exceeds the high temperature setting set by the user and displayed by line **25** then blower motor **33** and condensing unit **17** will start. As a result, indoor air enters the "closed" damper **12e** at return air intake **12c**, passes through heat exchange coil **10** whose cooling rows **10b** are cooled by the condensing unit **17**, and is supplied to building ducting through supply air discharge **9a**. However, if the indoor temperature sensed by user interface sensor **28** is higher than the outside temperature sensed by sensor **5**, then the damper will move to the "open" position (**12h**). During vapor compression cooling operation the speed of the blower motor is fixed at a setting selected using the user interface **1**. Dual coil **10** is shown as a single coil with both heating rows **10a** and cooling rows **10b**, but separate heating and cooling coils may also be used.

With user interface **1** set to provide heating, when the indoor temperature measured by sensor **28** falls below the heating temperature setting, the air handler **9** (or furnace) and pump **16** is turned on. Air drawn from the building through return air intake **12c** is heated by the heating rows **10a** of coil **10** and delivered to the ducting through supply air discharge **9a**. Pump **16** delivers hot water from heat source **18** through pipes **20** and the coil heating rows **10a**. In heating mode the speed of motor **33** may be varied as a function of the difference between the desired temperature setting selected by the user at user interface **1** and the temperature measured by temperature sensor **28**. At hourly time intervals, damper **12** opens to admit a prescribed volume of outside air to building interior **31** that is selected using user interface **1** for the purpose of maintaining indoor air quality. If air handler **9** operates to deliver heated air during any hour, damper **12** cycles open until said prescribed volume of outside air is delivered. If at the end of the hour air handler **9** has not operated, damper **12** opens and blower motor **33** operates at low speed to deliver said prescribed volume of outside air. Control module **3** tracks the volume of outside air that has been introduced to the building each hour by the AHU and cancels further damper operation when the hourly air volume is approximately equal to the said prescribed volume of outside air admitted.